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Definition 1 : Let $\mathbb{N}$ denote the set of all natural numbers

Definition 2 : FOL is defined by adding a 1-ary function symbol f to the language of first order set theory with countably many variable term symbols and the set-membership relation symbol $\in$.

Definition 3 : For any formal language $\mathcal{L}$, let Shar($\mathcal{L}$) denotes the power set of all "well-formed formulas + $\mathsf{ACA}_{0\mathcal{L}}$ in $\mathcal{L}$" where $\mathsf{ACA}_{\mathcal{L}}$ denotes ACA_0 written in $\mathcal{L}$.

Definition 4 : Δ_0 is the set that does not contain unbounded quantification.

Definition 4a : a theory is the set of sentences in any formal language

Definition 5 : Let Re denote the class of all recursive ordinal

Definition 6 : a binary relation $\prec$ is called QI if it satisfies the following properties:

$$\begin{aligned}
&(\forall x)[\neg x \prec x] \wedge \\
&(\forall x)(\forall y)[x \prec y \vee x = y \vee y \prec x] \wedge \\
&(\forall x)(\forall y)(\forall z)[x \prec y \wedge y \prec z \rightarrow x \prec z] \wedge \\
&(\forall X \subseteq \mathbb{N})[(\forall x)[(\forall y \prec x)[y \in X] \rightarrow x \in X] \rightarrow (\forall x)[x \in X]]
\end{aligned}$$

Definition 7 : For any sufficiently strong theory T

$$\mathrm{PTO}(T) := \sup\{\mathrm{otyp}(\prec) \mid \prec \subseteq \mathbb{N}^2 \wedge \prec \in \Delta_0 \wedge T \vdash \prec \ \textsf{is}\ \mathbf{QI}\}$$

Definition 8 : Let $\mathrm{el} : \mathrm{Shar(FOL)} \rightarrow \mathbb{N}, n \mapsto \mathrm{el}(n)$ is a gödel number function, 1 - 155063 is all unicode version 16.0 characters ordered using unicode convention and after that it followed by infinitely many constant symbol, infinitely many variable symbol, n-ary predicate symbol, and n ary relation symbol, using veritasium hilbret hotel video scheme, thou shall know that!

Definition 8a : for any set S binary relation $\in_{sub}$ defined by the following:

$$\forall p(p \in_{sub} S \leftrightarrow \exists k(k \subseteq S \wedge p \in k))$$

Definition 8b : for any $a \in$ Shar(FOL), for any $b \in$ Shar(FOL) binary relation $<_{el}$ be defined by the following :

$$a <_{el} b \leftrightarrow \mathrm{el}(a) < \mathrm{el}(b)$$

Definition 9 : Let a set

$$\mathrm{S} = (\{T \in_{sub} \mathrm{Shar(FOL)} | \mathrm{PTO}(T) < \omega_1^{CK}\}, \in_{el})$$

Definition 10 : Let a function $h\ : \mathbb{N} \to \mathcal{P}(S), n \mapsto h(n)$ as

$$\{T \in_{sub} \mathrm{Shar(FOL)} | h(T) < n, \forall n \in \mathbb{N}\}$$

Definition 10a : Let STM denote the set of all turing machine

Definition 10b : ProvableTermination(T_q, M, p) holds if and only if there exists a formal proof in the theory T_q (using at most p symbols) of the statement "Turing machine M halts on all inputs

Definition 10c: Halts(M, N) holds if and only if Turing machine M halts (on the empty input) within N computation steps.

Definition 11: for every natural number p and q, let a function $g : \mathbb{N} \times \mathbb{N} \to \mathbb{N}$ as

Let a natural number

$$Q = \min \left\{ N \in \mathbb{N} \;\middle|\; \begin{array}{l} \forall M \in \mathrm{STM}, \forall T_q \in S(p), \\ \big(\mathrm{ProvableTermination}(T_q, M, p) \implies \mathrm{Halts}(M, N)\big) \end{array} \right\}$$

If $Q \in \mathbb{N}$: $g(p, q) = Q$ otherwise $g(p, q) = 1$

Definition 12: a function $k : \mathbb{N} \to \mathbb{N}, n \mapsto k(n)$ as

$$k(n) = \sum_{k=0}^{n} g(n, k)$$

Final: Coin a number Shèhuì zhǔyì guójiā rénmín dìwèi gāo bǎn yī as $k^i(i)$ where i is meta natural number $12 \uparrow^{12} 12$ with respect to uparrow notation